CHAPTER 3 - STANDARD LANDSCAPE METHOD

**NOTE – THE STANDARD LANDSCAPE METHOD WAS CALLED STANDARD GUIDEBOOK METHOD IN PREVIOUS VERSIONS. THE PROCEEDURES ARE THE SAME, ONLY THE NAME CHANGED TO BETTER REFLECT THE METHODOLOGY.*

The Standard Landscape (quantitative) Method for fire regime and FRCC provide the training and validation for the scorecard methods. It is the recommended method for use in determining FRCC for all Project Landscapes that have not been assessed before. Users should be trained first in the Standard Landscape Method to provide them with a ground truth understanding of inputs to landscape fire regime and FRCC and then trained with the scorecard methods.

The fire regime and FRCC field methods described here are the recommended procedures for conducting the Standard Landscape Method for fire regime and FRCC. they will guide the user through the worksheet in Appendix 3-A.

Field Numbers
Fields are generally numbered sequentially. However, often there are field numbers that are not used. These are numbers that are retained for use by the computer or for storage of data from a former version.

Standard Landscape Procedure - Landscape Scale Fields (Fields 1 - 20)

This data describes the landscape as a whole. The first four fields (Registration Code ID, Project Code, Project Number and Sampling Date) allow the unique identification of a landscape or project area.

Registration Code ID (Field 1-REGCOD) – Required – For federal agency and TNC personnel using the web version or downloading the stand alone version the Registration Code is a 4-character code assigned from the FRCC help desk based on your agency affiliation. Standard codes are assigned to all federal agency and TNC units that cannot be used by other units (check the website at http://frcc.gov/ for an updated list, contact the help desk at helpdesk@frcc.gov if your land management unit is not listed). For users that do not have web access and for non-federal agency users contact your federal, state, TNC or private agency coordinator (a list is provided on the training CD).. We encourage non-federal agency users to use one Registration Code per "group", and then use a Project Code for separate monitoring projects.

Project Code (Field 2-PROCOD) – Required – The Project Code is an 8-character code used to identify project work that is done within the unit (you are not required to use all eight characters). Some examples of Project Codes are:

TCRESTOR = Tenderfoot Creek Restoration

BurntFk = Burnt Fork Project

SCPF1 = Swan Creek Prescribed Fire, Unit 1

BoxCkDem = Box Creek Demonstration Project

You may want to use the same code you would use in the National Fire Plan Operations Reporting System (NFPORS) or, if you are a non-federal employee, link it to whatever reporting system you may use. In NFPORS this would be your "treatment unit name".

It will be easier to read sorted results if you do not include digits in the left most position of the project code. For instance, if two of your projects are 22Lolo and 9Lolo, when sorted 22Lolo will come before 9Lolo. The preferred option would be to name the projects Lolo09 and Lolo22, although Lolo9 and Lolo22 will sort in the proper order, also.

Project Number (Field 3 – PLOJID) – Required – Identifier that corresponds to the fire, vegetation, and fuel management landscape or project area. Integer value.

Project Characterization Date (Field 4-SDATE) – Required – The characterization date is the date you want assigned to the landscape or project summary as a whole that makes this data unique from previous or subsequent characterization. The date of characterization should be entered in Field 4 of the FRCC sampling form as an 8-digit number in the MM/DD/YYYY format where MM is the month number, DD is the day of the month, and YYYY is the current year. So, April 10, 2001 would be entered 04/10/2001.

If the same landscape or project is being re-measured after treatment of one or more units or to update condition class following a period of succession or unplanned disturbances, be sure to keep the same project code and project number. The only item to change will be the project characterization date. Strata or treatment units within the landscape or project that have not changed can be copied in the data entry program from the previous project code/project number date of characterization to the new date and only those strata or treatment units that have changed need to be entered as new data.

Examiner Name (Field 5-NAME) – Required – The Examiner code is the email address of the crew boss or lead examiner. The examiner's email address corresponds to the Examiner's UserID in the central FRCC database at http://frcc.gov/.

If the project is exported to the central database, the website will verify that the examiner is a certified FRCC user or trainer. If the examiner is not certified, the FRCC website will not allow the project to be viewed by other users or exported to the NFPORS or LANDFIRE databases.

For users that do not have an email address, but have downloaded software, enter a UserID assigned to you by the help desk at the time you receive your registration ID.

For users that do not have an email address, do not have software, and have not been assigned a UserID by the help desk, but are using the field forms and worksheets to hand calculate FRCC, enter your first and last name with no spaces in between.

Project Name (Field 6-PROJECT) – Required – The name of the project can be up to 50-characters. The project name is the name of the overall landscape or project area where you will be applying the field procedures for FRCC. This project is usually named by the major drainage or other prominent feature.

You may want to cross reference this with your NFPORS "Project" or "Treatment Unit Name" or another reporting system if you are a non-federal employee.

Project Area (Field 7-AREA) – Required – The area of the project in an integer value. The project area is the size of the overall landscape or project area where you will be applying the field procedures for FRCC.

Project Area Units (Field 8-UNITS) – Required – Choose either acres or hectares for the size of the project area from field 7.

Recording a Georeferenced Project Position

The next set of fields provides georeferencing for your Project area. These fields are not required, but can be important for re-taking photographs, for placing the Project in a Geographic Information System, and for cross-walking to the NFPORS database (although a better georeference position for NFPORS may be the strata locations – Fields 43 and 44).

We recommend using a GPS receiver to record latitude and longitude, in decimals rather than degrees. Try to select a central position with a good panoramic view. Then record the GPS coordinates to the sixth decimal place.

Latitude (Field 10-LATC) – **Not Required –** Enter the latitude of the landscape or project in decimal degrees to the sixth decimal place (e.g., 45.951234).

Longitude (Field 11-LONGC) – **Not Required –** Enter the longitude of the landscape or project in decimal degrees to the sixth decimal place (e.g., 95.951234).

Datum (Field 15) – Not Required – Enter the datum used. Datum is a model used to represent map coordinates on the Earths surface. If you are unsure of which to use contact your local GIS coordinator to see what datum they prefer you use.

You may want to use the same georeference position you used in your NFPORS reporting system or other non-federal reporting system. In NFPORS this is a center point in your project.

Documenting Project Landscape with Current and Historic Photos

Digital photographs and scans are a useful means to document the project a number of ways. They provide a unique opportunity to visually assess the landscape or project area or vegetation class in a database format for both local and regional/national use. Of particular value are digital photos and scans showing current and historic oblique views or current and historic aerial views. In addition, previously established projects can be found by orienting the landmarks in photos to visual cues in the field. Photos can be compared to determine important changes after project implementation or an unplanned fire or other disturbance event. Photos provide excellent communication tools for describing project rationale to the public and fire and fuels personnel. Possibly the most important use of these photos will be to develop a photo series once your data and photos are uploaded to central data storage.

Document the landscape or project using a current landscape view photograph. If available, scan a historic picture of the landscape project area from a similar view or for a landscape with similar potential vegetation or vegetation land types. You can also document the current and historic conditions using digital photographs or scans of aerial photographs from current (recent) and historic (such as 1930s) aerial photography. Enter the file name path of the digital picture or scan.

Current Photo (Field 16-LSCPHOTO) – Not Required – Use the browser to enter the file name path. The digital photo file will be uploaded with the database when you upload to the central location.

Current Photo Date (Field 17-LSCPHOTODT) – Not Required – Enter the date the Current Photo was taken.

Historic Photo (Field 18-LSHPHOTO) – Not Required – Use the browser to enter the file name path. The digital photo file will be uploaded with the database when you upload to the central location.

Historic Photo Date (Field 19-LSHPHOTODT) – Not Required – Enter the date the Historical Photo was taken.

Entering Comments about the Landscape or project
The Comments field is provided so that the field examiner or crew can record any information associated with the landscape or project that cannot be recorded elsewhere on the form. For example, you can record ecological conditions, dates of wildland fire or fire use occurrence, directions, historic information, and/or other important attributes.

Comments (Field 20-COMMENTS) – **Not Required –** Enter up to a 256-character comment. Try to use shorthand and abbreviations to reduce space as long as the comments are still understandable. You might try to organize comments in a standard order with appropriate punctuation. For example, you might describe history of the area first and only use colons to separate the next major category of comments.

Standard Landscape Procedure Strata Fields (Fields 21- 60)

The Strata fields describe the biological, physical, and fire regime characteristics of the management unit for each of the Project Landscape stratifications.

Through review of existing data, current management plans, field reconnaissance, or assessment of treatment units delineate the landscape or project area into strata by differences in fire regime groups (table 3-1- Page 3-25), potential lifeform (table 3-2 – Page 3-26), current conditions (physical and/or biological), and treatment or non-treatment units.

You can delineate as many strata as you would like as long as strata percent composition sum to 100% of the landscape or project area and they are characterized for one time (date). Do not

include strata that mix characterization dates. To characterize strata for a different time period or for re-measurement enter or copy the same project code and number, but change the strata characterization date. Then copy those strata that have not changed and enter new data for the strata that have changed.

If you are conducting a rapid reconnaissance we suggest you do not include types that make up less than 20 percent of the project area (thus with 5 each at 20% you can only have up to 5 strata for 100% of the project area) unless the type has very important management implications. Keep it simple by stratifying only the dominant 2-3 types.

Strata Number (Field 21-BIOSTRATANUM) – **Required –** This field is automatically entered in by the computer if you are using the software or you can enter the number of the Strata yourself. It is recommended that the Strata be numbered incrementally, starting with 1. (e.g. 1, 2, 3… n)

Strata Code (Field 22-CODE) – **Not Required** – Code that may be used to crosswalk the strata to a reporting system, such as NFPORS (e.g. This can be linked to the "Treatment Unit Name" in NFPORS).

Strata Name (Field 23-NAME) – **Not Required** – Name associated with the strata.

Strata Characterization Date (Field 24-STRATADATE) – **Required** – Date the strata data was collected. This date can be different from the project characterization date because of a different date of sampling, but should characterize the strata for the same general time period.

****Caution – Field 25 is where most errors occur. Be sure you identify the correct PNVG using the guidelines below**

Strata Bp Land Unit Code (Field 25-CBpLUTYP) – **Required** – Enter the 4-6 character code for the coarse scale BpLU (potential natural vegetation group (PNVG)), from table 3-3 or 3-4, from the field code sheet, or from the pop down menu that best describes the BpLU-PNVG indicator species. If you enter any code except for NNNN or XXXX the next field (26) will be automatically filled with the appropriate lifeform. Use the Schmidt et al. (2002) GTR and this document as descriptive references, along with Bailey (1995), Kuchler (1975), and Brown and Smith (2000).

Identifying the Coarse-scale PNVG
Review the following terms:

Natural cover – the assemblage of species, usually named by the most common or dominating species, that occupies the area for the majority of time during the normal (± 33% of the central

tendency measure) disturbance and succession regime cycles, in the absence of modern human mechanized intervention.

Historical cover – the assemblage of species, usually named by the most common or dominating species, that occupied the area for the majority of time during the normal (+ 33% of the central tendency measure) disturbance and succession regime cycles, prior to Euro-American settlement and modern mechanized intervention.

Importance – natural (or historical as a proxy) is important to understand because this is the assemblage of species and their amounts that would be in sync with the normal disturbance and succession regime cycles, given no management and no investment; this provides a baseline reference for quantifying disturbance and succession outcomes, and associated diversity of species without management, that can be compared to outcomes with management and varying levels of investment.

Forest – conifer or broadleaf trees with a general average height to the top of the upper layer greater than 30 feet (approximately 9 meters) with fairly continuous and complete canopy closure occupy the majority of succession from post-replacement disturbance to maturity.

Woodland - conifer or broadleaf trees with an average height to the top of the upper layer less than 30 feet (approximately 9 meters) with non continuous canopy closure occupy the majority of succession from post-replacement disturbance to maturity.

Cover – canopy cover is approximately twice (2x) foliar cover (e.g. 30% canopy cover of sagebrush is approximately 15% foliar cover using line intercept).

After reviewing the terms use the following key to determine the potential natural lifeform.

Strata Bp Land Unit Lifeform (Field 26-CBpLUFORM) – **Required –** If you entered NNNN or XXXX in field 25 enter the 2-character lifeform code that best describes the BpLU site indicator lifeform that would be an indicator of the stratification 1 site conditions (Table 3-2 pg 3-29) otherwise this field will be populated for you.

Key to Potential Natural Lifeforms

A. Natural average potential height (height of most mature successional stage) of upper layer greater than 30 feet (approx 9 meters) and canopy cover of forest typically greater than 15% -- Forest – The most common error in potential natural lifeform identification is selection of "Forest" because there are currently trees present. Before moving forward check this call by looking at historical oblique or air photos to confirm this call. Another cross check is to determine if all or most of the current trees are one size class that is a younger age than the time since Euro-American settlement. This is a good indicator the area may not have natural forest potential.

AA. Natural average potential height (height of most mature successional stage) of upper layer less than 30 feet (approx 9 meters) and canopy cover of forest less than 15% -- Non-forest – go to B.

B. Natural canopy cover of woodland greater than 15% -- Woodland - The second most common error in potential natural lifeform identification is selection of "Woodland" because there are currently woodland trees present. Before moving forward check this call by looking at historical oblique or air photos to confirm this call. Another cross check is to determine if all or most of the trees are one size class that is a younger age than the time since Euro-American settlement. This is a good indicator the area may not have natural forest potential.

BB. Natural canopy cover of woodland less than 15% -- Non-woodland – Go to C.

C. Natural foliar cover of shrubs greater than 5% -- Shrubland - The third most common error in potential natural lifeform identification is selection of "Shrubland" because there are currently shrubs present. Before moving forward check this call by looking at historical oblique or air photos to confirm this call. Another cross check is to determine if all or most of the shrubs are of a size class and age that could not be achieved within the natural fire frequency. This is a good indicator the area may not have natural forest potential.

C1. Potential for forest and woodland species greater than 15% canopy cover with removal of natural disturbance – Shrubland with Trees

C2. Potential for forest and woodland less than 15% canopy cover with removal of natural disturbance -- Shrubland

CC. Natural foliar cover of shrubs less than 5% -- Non-shrubland – go to D.

D. Natural canopy cover of grasses, forbs, and other herbs greater than 5% -- Grassland

D1. Potential for forest and woodland species greater than 15% canopy cover with removal of natural disturbance -- Grassland with Trees

D2. Potential for shrub species greater than 5% foliar cover with removal of natural disturbance -- Grassland with Shrubs

D3. Potential for shrub species less than 5% without natural disturbance – Grassland

DD. Natural cover of grasses, forbs, and other herbs less than 5% -- Barren

Once you have identified the lifeform proceed to the appropriate table (table 3-3 for western U. S. forest and table 3-4 for western U.S. woodland, shrubland, or grassland) to select the PNVG. If you are from the **East** use the coarse-scale GTR-87 list, also provided on the code sheet and in the pop down menu of the software. An effort is underway to refine the PNVG classification and develop the reference values for the East. Be sure to check for updates. If you are from Alaska

enter a local code. An effort is underway to develop a PNVG classification and the associated reference values for Alaska. Be sure to check for updates. For selection of the PNVG in table 3-4 (western U.S. woodland, shrubland, and grassland) you will need to determine if the **natural cover is shrubland or grassland PNVG influenced by tree or shrub**. Use the following interpretations to help you make this determination.

Forest or woodland tree in shrubland or grassland

Shrubland or grassland is the **natural cover**

Trees currently present on the strata land unit

Trees not currently present, but have potential and available seed source

Shrub encroachment in grassland

Grassland is the **natural cover**

Shrubs currently present on the strata land unit

Shrubs not currently present, but have potential and available seed source

The PNVG classifications and associated reference values (tables 3-3 and 3-4 – Pages 3-27&28) for the western U.S. are from version 1.0.5. These values are in a review and refinement process. To make sure you have the most recent values, users with internet access should check the FRCC website (http://frcc.gov/) or contact the help desk (helpdesk@frcc.gov). Users without web access should contact their federal, state, TNC or private agency coordinator (a list is provided on the training CD).

BpLU Indicator Species

Enter up to 4 species from the Natural Resources Conservation Service (NRCS) plant list that are indicative of the type of site conditions typical of the BpLU. A local list of NRCS species will be developed in the database starting with a list of common species that occur in the coarse-scale BpLU (field 25) plus the addition of any additional species you enter. This local list can be popped up and will limit the number of NRCS codes you need to deal with.

Indicator Species 1 (Field 27-INDSPP1) – **Required** – Enter the NRCS plant code.

Indicator Species 2 (Field 28-INDSPP2) – **Not Required** – Enter the NRCS plant code.

Indicator Species 3 (Field 29-INDSPP3) – **Not Required** – Enter the NRCS plant code.

Indicator Species 4 (Field 30-INDSPP4) – **Not Required** – Enter the NRCS plant code.

Local Bp Land Unit Strata Code (Field 31) – **Not Required** – Enter up to a 10-character alpha-numeric code for the local BpLU (for example landtype, habitat type, plant association, range site, ecological land unit, potential vegetation type or group, etc.).

Landform (Field 32) – **Required** – Enter a coarse-scale landform code from the following list:

Code	Landform
GMF	Glaciated mountains-foothills
NMF	Non-glaciated mountains-foothills
BRK	Breaklands-river breaks-badlands
PLA	Plains-rolling plains-plains w/ breaks
VAL	Valleys-swales-draws
HIL	Hills-low ridges-benches
OTH	Other-explain in comments

If OTH (other) is used explain in the strata comments (field 60).

Average Slope Class (Field 34) – **Required** – Enter a slope class from the following list:

Class	Slope (percent)
GENTL	0-10
MOD	11-30
STEEP	31-50
VSTEEP	> 50
OTH	Other-explain

If OTH (other) is used explain in the strata comments (field 60).

Insolation (Aspect) Class (Field 36) – **Required –** Insolation is a relative classification of the amount of sun heating reception. This is typically related to the aspect of slopes and influences of cold or warm air flow. Enter an insolation class from the following list:

Class	Insolation
LOW	NW, N, NE, E, or flat if cold air drainage
MOD	Flat (≤ 10% slope) or all aspects
HIGH	W, SW, S, SE, warm air upflow from adjacent valley
OTH	Other-explain

If OTH (other) is used explain in the strata comments (field 60).

Low Elevation (Field 38) – Required – Enter an elevation that represents the typical lower elevation of the strata. This is not the statistical minimum, but the typical lower elevation of the strata if the stratum covers an elevation zone. If the elevation does not change within the strata then enter the same elevation for low and high. If you were to use GIS to calculate this elevation you would select the polygons with lowest 10% slope values and determine the average or median value.

High Elevation (Field 39) – Required – Enter an elevation that represents the typical upper elevation of the strata. This is not the statistical maximum, but the typical upper elevation of the strata if the stratum covers an elevation zone. If the elevation does not change within the strata then enter the same elevation for low and high. If you were to use GIS to calculate this elevation you would select the polygons with highest 10% slope values and determine the average or median value.

Elevation Units (Field 40) – **Required** – Choose Feet or Meters.

Strata Composition (Field 41) – **Required** – Enter the percent composition for this strata of the total project area (e.g. enter 20 for 20% do not enter .20). The sum of all strata for a project must add to 100 percent.

Recording a Georeferenced Strata Position

The next set of fields is not required, but important if you want to relocate the general strata location or cross-walk the location to the NFPORS data base. These fields fix the geographic location of a point within the strata area.

Your selection for location of the strata position is flexible. A point that is generally central to the strata area or a point that provides a good visual perspective of the strata. The position should be the location where the current strata photo (field 49) is taken from so that the photo could be repeated at a later date for monitoring purposes.

Latitude (Field 43-LATC) – **Not Required** – Enter the latitude in decimal degrees of the plot center into Field 9 of the PD Plot Form to the sixth decimal place (e.g., 45.951234).

Longitude (Field 44-LONGC) – **Not Required** – Enter the longitude in decimal degrees of the plot center into Field 10 of the PD Plot Form to the sixth decimal place (e.g., 95.951234).

Datum (Field 48) – Not Required – Enter the datum used. Datum is a model used to represent map coordinates on the Earths surface. If you are unsure of which to use contact your local GIS coordinator to see what datum they prefer you use.

Current Strata Photo (Field 49-PHOTO) – **Not Required** – Use the browser to enter the file name path. A copy of the digital photo file will accompany the database when you upload to the central data storage location.

Strata Photo Date (Field 50-PHOTODT) – **Not Required** – Enter the date the Strata Photo was taken.

Reference Fire Frequency (Field 51) – **Required** – Enter the central tendency (average, midpoint, median) for the natural fire frequency. This can be taken from the national coarse-scale fire frequency (tables 3-3 and 3-4), Fire Frequency (MFI (mean fire interval)), from regional values, or from local estimates. The central tendency for the natural fire frequency is also the same as the reciprocal of the average probability of natural fire (for example 1/.10 probability = 10 year frequency). The fire frequency can also be calculated as (fire exclusion date – first natural fire record date)/ (number of natural fires – 1). The data entry program will automatically populate this value with the national coarse-scale reference value (tables 3-3 and 3-4). If you want to review information about the coarse-scale reference conditions for this BpLU-PNVG refer to the FRCC web page. This estimate of central tendency for the natural fire frequency is assumed to have plus or minus 33 % variation when compared in a ratio to the current fire severity for classification of FRCC.

We discourage people from conducting destructive fire history sampling unless they have education and training in fire history methodologies, intend to integrate this information with other reference data (such as succession rates and historical photography) with simulation modeling, and intend to publish the findings for others to use. We encourage people to conduct field reconnaissance, consult the literature and expert opinion, and integrate this with other information using simulation modeling in an interdisciplinary framework. If you decide to conduct or contract a fire history study according to published protocols and methods and are looking for an outlet for publication of your studies please contact the website.

Current Fire Frequency (Field 52) – **Required** – Enter the current fire frequency.

Estimate current fire frequency by conducting a thorough analysis of post-settlement fire activity. Here we're referring to fires burning in a somewhat natural manner, not suppressed spot fires. For example, you might want to count fires that burned at least 5 or 10 percent of your Project Landscape.

There are several ways to assess current fire frequency. You will be estimating mean (central tendency) fire interval when possible. This estimate of central tendency for the current fire frequency is assumed to have plus or minus 33 %. You can summarize Fire Atlas records, you can examine stumps for recent fire scars, or you could take a few increment cores from area age classes. Then, you compare the findings to the presettlement fire regimes by reviewing the literature, consulting with experts, or by using the FRCC default models that we mentioned above (tables 3-3 and 3-4 or estimate for East and Alaska). Here are some other guidelines that might help:

Rule One. If your analysis suggests that fires are now markedly more frequent than during the historical era, estimate the Mean Fire Interval. For example, current fires might be unnaturally frequent in areas with heavy cheatgrass encroachment.

Rule Two. If your analysis suggests that fire occurrence has not changed markedly during the post-settlement era, estimate the Mean Fire Interval. For example, fire atlas records might show five fires during the past sixty years. The MFI would be 15 years, or, sixty years divided by four fire intervals.

Note: Sometimes you can't calculate an MFI, particularly with the long-interval fire regimes. If your analysis suggests that the current fire interval is still within the natural range, simply re-enter the Natural Fire Frequency value from Field 51.

As you will see below, this signifies "No Change" when calculating Condition Class. But if you're unsure in this regard, enter the actual current interval.

Rule Three. If your analysis suggests that fire exclusion has caused a decline in fire frequency, enter the years since last fire, or calculate a Mean Fire Interval if possible. If you can't find any fire evidence for the post-settlement era, enter 100 years as a default value.

Natural Fire Severity (Field 53-) – **Required** – Enter the average natural fire severity (upper layer lifeform replacement). This value depicts the degree of upper canopy replacement (top-kill) which would occur during peak burning season conditions (90^{th} plus percentile), viewed at a large scale under natural conditions. Stated another way, the natural fire severity is a landscape measure of the proportion of a fire area which would experience greater than 75% upper canopy replacement during an unconstrained, naturally occurring fire event. For example, a natural fire severity of 50% should be interpreted as half the fire area experiencing upper layer canopy replacement of greater than 75%. In this example, the remaining 50% of the landscape would experience non-replacement fire severity, which is defined as less than 75% upper canopy replacement.

This value corresponds to the upper layer lifeform, not the upper layer size class. For example if there are scattered large conifers with an interspersed in-growth of pole and sapling conifers the estimate is for the replacement of the conifers in that upper layer as a whole (including large, pole, and sapling). In contrast, if there are only scattered large conifer trees with an herbaceous understory the estimate is for the replacement of the large conifers. The value can range from 0 to 100 percent. This can be taken from the national coarse-scale fire severity (table 3-3 or 3-4 Fire Severity (Replacement)), from regional values, or from local estimates. The data entry program will automatically populate this value with the national coarse-scale reference value (table 3-3 or 3-4 or estimate for East or Alaska). If you want to review information about the coarse-scale reference conditions for this BpLU-PNVG refer to the website http://frcc.gov/ or, if you do not have web access contact your federal, state, TNC or private agency coordinator (a list is provided on the training CD). This estimate of central tendency for the natural fire severity is assumed to have plus or minus 33 % variation when compared in a ratio to the current fire severity for classification of FRCC.

Current Fire Severity (Field 54) – **Required** – enter an estimate of the current fire severity as a percent of the upper layer lifeform that currently exists that would be burned during similar conditions as used for estimating the natural fire severity. You are encouraged to enter a local expert estimate or average determined from modeling using fire effects and behavior models. This estimate of central tendency for the current fire severity is assumed to have plus or minus 33%.

A. For replacement natural fire regimes (fire regime II, IV, and V) use the natural fire severity central tendency as a default value (tables 3-3 and 3-4 or estimate for East or Alaska) unless amounts of uncharacteristic vegetation-fuel class variables have caused a decrease in potential fire severity.

B. For surface or mixed fire regimes (fire regime I and III) use the natural fire severity central tendency estimate (tables 3-3 and 3-4 or estimate for East and Alaska) as a default when you feel your estimate of current is within plus or minus 10 percent of the natural fire severity. If your estimate of current is greater than 10 percent different, then enter the central tendency for the range of current fire severity you feel fits the closest: 0-5% - central tendency = **3**%; 6-15% - central tendency = **10**%; 16-25% – central tendency = **20**%; 25-55% - central tendency = **40**%; 56-85% - **70**%; and 86-100% - central tendency = **90**%.

Strata Metadata

Reference Vegetation-Fuel Class Percent Composition Source (Field 55) – **Required** – enter a 1-character code from the following list. The selections are ordered from least rigorous to most rigorous in validity of the values.

N - non-local expert estimate
D - coarse-scale default values from lit. review/modeling workshops
R - region/state default values from lit. review/modeling workshops
L - local expert estimate
T - interdisciplinary team (IDT) consensus w/ local expert
M – local expert estimate + lit. review/modeling
B - IDT consensus from lit. review/modeling workshop w/ local expert
F – published local study + lit. review/modeling workshop

Current Vegetation-Fuel Class Composition Source (Field 56) – Required – enter a 1-character code from the following list. The selections are ordered from least rigorous to most rigorous in validity of the values.

V - visual estimate
R - walk through and visual estimate
M - mapped summary

Natural Fire Frequency and Native American Burning (Field 57) – Required – enter a 1-character code from the following list to indicate how you addressed the issue of inclusion of Native American burning in the natural reference conditions. Refer to Barrett and Arno (1982) for a discussion of ecological implications.

C – used coarse-scale default

A – Substantial Native American burning influence included

D – Substantial Native American burning influence, but not included

W – Native American burning considered but not different than without

N - Native American burning influence not considered

B to C Vegetation-fuel class breakpoint (Field 58) – Required – Enter the breakpoint percent canopy closure for differentiating between classes B and C. The default is 35% for forest, woodland, and herbland and 15% for shrubland. If you use the national coarse-scale default composition values from tables 3-3 and 3-4) the software will assume the breakpoints.

D to E Vegetation-fuel class breakpoint (Field 59) – Required – Enter the breakpoint canopy closure for differentiating between classes D and E. The default is 35% for forest, woodland, and herbland and 15% for shrubland. If you use the national coarse-scale default composition values from tables 3-3 and 3-4) the software will assume the breakpoints.

Strata Comment (Field 60) – Enter comments for the strata. For fields where you used an other (OTH) code or could not assess describe the situation.

Standard Landscape Procedure Strata Vegetation-Fuel Class Composition Fields (Fields 62- 75)

Use national coarse-scale reference condition vegetation-fuel class descriptions, regional or state descriptions if available, or develop custom local descriptions of the characteristic and uncharacteristic succession/disturbance classes. These values are in a review and refinement process. To make sure you have the most recent values, users with internet access should check the FRCC website (http://frcc.gov/) or contact the help desk (helpdesk@frcc.gov). Users without web access should contact their federal, state, TNC or private agency coordinator (a list is provided on the training CD). See table 3-6 for general description of the standardized classes. Canopy cover values are the coarse-scale default values. These may be different for some PNVGs in the national coarse-scale descriptions (see web page or help desk for most current descriptions) and may be refined regionally or locally.

Vegetation Fuel Class (Field 62) – **Required** – Enter the 4 character code for the Vegetation Fuel Class from table 3-6 (these are the formal data entry codes). The characteristic vegetation-fuel Classes AESP (Early seral post-replacement), BMSC (Mid seral closed canopy), CMSO (Mid seral open canopy), DLSO (Late seral open canopy), and ELSC (Late seral closed canopy)are required and will be created by the program (Note that we commonly also use the shorthand codes A through E in referring to these characteristic vegetation fuel classes). If you choose to use the national coarse-scale default composition values for the characteristic types then you should review the description on the web page or from the help desk. Additional classes may be added if they occur, based on the description in table 3-6.

Upper Layer Lifeform (Field 63) – **Required** – Enter the 4 character code for the lifeform in the upper layer. This is based on reference conditions for characteristic types, and current conditions for uncharacteristic types. Work through the list sequentially from coniferous trees to does not fit any category and use the determination criteria. If the determination criteria do not fit then go to the next row.

Code	Lifeform	Upper Layer Determination Criteria
CONT	Coniferous Trees	$\geq$ 15% canopy cover
BRDT	Broadleaf Trees	$\geq$ 15% canopy cover
SHRB	Shrubs	$\geq$ 5% line intercept cover or 15% canopy cover
HERB	Herbaceous (graminoids, forbs, and ferns)	$\geq$ 15% canopy cover
MOSS	Moss or Lichens	> 5% ground cover
NVEG	Non-vegetated	< 5% any vegetation cover
NNNN	Does not fit any category	

Upper Layer Size Class (Field 64) – **Required** – Enter the 4-character majority size class code of the upper layer life form (field 63). This is based on reference conditions for characteristic types, and current conditions for uncharacteristic types.

Class	Dimensions
Coniferous and Broadleaf Trees	
SEED	Seedling - Trees that are less than 4.5 feet (1.37 meters) tall.
SAPL	Sapling - Trees that are greater than 4.5 feet (1.37 meters) tall and less than 5.0 in (13 cm) DBH.
POLE	Pole - Trees that are greater than 5 in (13 cm) DBH and less than 9 in (23 cm) DBH.
MEDM	Medium - Trees that are greater than 9 in (23 cm) DBH and less than 21 in (53 cm) DBH.
LARG	Large - Trees that are greater than 21 in (53 cm) DBH and less than 33 in (83 cm) DBH.
VLAR	Very large - Trees that are greater than 33 in (83 cm) DBH.
Shrubs	
LOWS	Low - Shrubs that are less than 3 feet (1 meter) tall.
MEDS	Medium - Shrubs that are greater than 3 feet (1 meter) tall and less than 6.5 feet (2 meters) tall.
TALS	Tall - Shrubs that are greater than 6.5 feet (2 meters) tall.
Herbaceous	
LOWH	Low - Herbaceous less than or equal 2 feet (0.6 meters) tall.
TALH	Tall - Herbaceous greater than 2 feet (0.6 meters) tall.
Other	
MMLL	Moss, Lichens, Litter/Duff
BARN	Barren, Rock, Gravel, Soil
NNNN	Does not fit any category, Unable to Assess

Upper Layer Canopy Closure (Field 65) – **Required** – Enter the code for the estimated canopy closure of the upper vegetation layer. This is based on reference conditions for characteristic types, and current conditions for uncharacteristic types:

Class	Crown
0	Zero percent
0.5	Trace or 0-1 percent
3	Present or 2-5 percent
10	>5-15 percent
20	>15-25 percent
30	>25-35 percent
40	>35-45 percent
50	>45-55 percent
60	>55-65 percent
70	>65-75 percent
80	>75-85 percent
90	>85-95 percent
98	>95-100 percent
XX	Could Not Assess

Dominant Species 1 (Field 66) – **Required** – Enter the NRCS plants database code. See description for fields 27 through 30. This is based on reference conditions for characteristic types, and current conditions for uncharacteristic types.

Dominant Species 2 (Field 67) – **Not Required** – Enter the NRCS plant code.

Dominant Species 3 (Field 68) – **Not Required** – Enter the NRCS plant code.

Dominant Species 4 (Field 69) – Not Required – Enter the NRCS plant code.

Surface Fire Behavior Fuel Model (Field 70-FMODEL) – **Not Required** – Chose the appropriate fire behavior fuel model from the Anderson 1983 publication, Aids for Determining Fuel Models for Estimating Fire Behavior. This is based on reference conditions for characteristic types, and current conditions for uncharacteristic types.

Anderson (1982) 13 Standard Surface Fuel Models

FM#		Vegetation Types	Fire Behavior	Fuels
0	--	Non-Vegetated		
1	--	Perennial Grasslands, Annual Grasslands, Savannahs, Grass-tundra, Grass-shrub with < 1/3 shrub or timber	Rapidly moving	Cured fine, porous herbaceous; .5-.9 tons surface fuel load per acre; .5-2 foot depth
2	--	Shrub, pine, oak, pinyon-juniper with < 2/3 shrub or timber cover	Moderate spread in herbaceous with added intensity from litter/wood and production of firebrands	Fine herbaceous surface cured or dead, litter, dead stem or limb wood; 1-4 tons surface fuel load per acre; .5-2 foot depth
3	--	Tall Grassland, Prairie, and Meadow	Fast moving with wind, but not as fast as FM 1	Tall herbaceous surface with > 1/3 dead or cured; 2-4 tons fuel load per acre; 2-3 foot depth
4	--	Coastal/Sierra Chaparral, Pocosin Shrub (fetterbrush, gallberry, bays), Southern Rough Shrub, Closed Jack Pine, Pine Barrens	Fast moving and intense	Flammable foliage and small dead woody material with or w/o litter layer; 10-15 tons fuel load per acre; 4-8 foot depth
5	--	Moist or Cool Shrub Types (Laurel, Vine Maple, Alder, Manzanita, Chamise), Forest/Shrub, Regeneration Shrubfields after fire or harvest	Slow moving and low to moderate intensity	Green foliage with or w/o litter; 3-5 tons per acre; 1-3 foot depth
6	--	Pinyon-juniper w/ shrubs, Southern Hardwood/ Shrub w/ Pine, Frost Killed Gambel Oak, Pocosin Shrub, Chamise, Chaparral, Spruce-taiga, Shrub-tundra, Hardwood Slash	Moderate spread and intensity, not as fast/ intense as FM 4, but faster than FM 4	Flammable foliage, but shorter and more open than FM 4 w/ less dead small wood and litter; 4-8 tons per acre; 2-4 foot depth
7	--	Palmetto-gallberry w/ or w/o Pine overstory, Black spruce/shrub, Southern Rough, Slash Pine/gallberry	Fast moving even at higher dead fuel moisture contents	Flammable foliage even when green; 4-6 tons per acre; 2-3 foot depth
8	--	Closed canopy short needle conifer types, Closed canopy broadleaf or hardwood types	Typically slow moving with low intensities; can move rapidly with high intensity with very low fuel moistures, & hot/dry/windy	Usually low to moderately flammable foliage with litter or scattered vegetation understory; 4-6 tons per acre surface fuels; .1-.5 foot depth
9	--	Long needle (ponderosa, Jeffrey, red, southern) conifer types, Oak-hickory and similar Hardwood types,	Fast moving fires with moderate to high intensity depending on amount of surface fuel	Flammable foliage with needle or leaf litter and some dead down woody material; 3-4 tons per acre; .1-.5 feet
10	--	Any Forest type with > 3" down dead woody fuels	High fire intensity with low fuel moisture and fast moving with wind	Dead down > 3" woody fuels and litter; 10-14 tons per acre of total surface fuel < 3"; .5-2 foot depth
11	--	Light Logging Slash, Partial Cut Slash	Fast moving and low to moderate intensity with wind	10-14 tons per acre total fuel load < 3"; .5-2 foot depth
12	--	Moderate and Continuous Logging Slash in Clearcuts or Heavy Partial Cuts and Thinned areas	Fast moving and moderate intensity fire	30-40 tons per acre total fuel load < 3"; 2-3 foot depth
13	--	Heavy and Continuous Logging Slash in Clearcuts or Heavy Partial Cuts and Thinned areas	Fast moving and high intensity fire	50-60 tons per acre total fuel load > 3"; 2-4 foot depth

Reference Percent Composition (Field 72) – **Required** – enter central tendency (mean, median, midpoint) reference condition percent composition estimate for these vegetation-fuel class stratifications. If you want to use the national coarse-scale western U.S. reference conditions for this BpLU-PNVG refer to tables 3-3 and 3-4. These values are in a review and refinement process. To make sure you have the most recent values, users with internet access should check the FRCC website (http://frcc.gov/) or contact the help desk (helpdesk@frcc.gov). Users without web access should contact their federal, state, TNC or private agency coordinator (a list is provided on the training CD). The data entry program will automatically populate these values. The sum of entries for the five characteristic classes must equal 100 percent. Do not be concerned with a minimum or maximum range of variation. This estimate of central tendency for each characteristic vegetation-fuel class is assumed to have plus or minus 33 % variation as an input to condition class.

We discourage people from conducting intensive stand or landscape sampling to reconstruct historical conditions unless they have education and training in methodologies, intend to integrate this information with other reference data (such as fire history and historical photography) with simulation modeling, and intend to publish the findings for others to use. We encourage people to conduct field reconnaissance, consult the literature and expert opinion, and integrate this with other information using simulation modeling in an interdisciplinary framework. If you decide to conduct or contract intensive stand or landscape sampling to reconstruct historical conditions according to published protocols and methods and are looking for an outlet for publication of your studies please contact the help desk at helpdesk@frcc.gov.

Current Percent Composition (Field 73) – enter a local estimate or map summary of the percent composition for this vegetation-fuel class within its strata and project area. The sum of entries for the five characteristic classes AESP, BMSC, CMSO, DLSO, ELSC, and any uncharacteristic classes must equal 100 percent. Any one patch or stand of vegetation-fuel can only have one characteristic or uncharacteristic vegetation-fuel code. You cannot double count such that the sum is greater than 100 percent. For example if uncharacteristic timber harvest (UTHV) has affected vegetation-fuel patches that make up 20% of the area and those same patches have an uncharacteristic pattern (UPAT) you must select the primary effect, which in this case would be the UTHV.

Class Representative Photo (Field 74-CLSREPPHOTO) – Use the browser to enter the file name path. The digital photo file will be uploaded with the database when you upload to the central location.

Class Representative Photo Date (Field 75-CLSREPPHOTODT) – Enter the date the Class Representative Photo was taken.

Standard Landscape Procedure Similarity, Abundance, and Condition Class Calculation Fields (Fields 77- 104)

Similarity (field 77 and 78) – This value is not entered into the database. The analysis program will calculate this value. To calculate this value yourself, for field 77, choose the smaller of the 2 values; either reference composition (field 72) or current composition (field 73). The sum of field 77 (the current similarity to the reference amount of the five characteristic classes) is the input for field 78 and is the similarity of the strata to the natural regime. This methodology follows Clements (1934) and is one of the most common and simple measures of similarity to central tendency of the reference composition.

Percent Difference (field 79) – This value is not entered into the database. The analysis program will calculate this value. To calculate this value yourself use the formula % Diff. = [{Current (field73)– reference (field 72)}/{Current (field73) + Reference (field 72)}] * 100.

Ecological Sustainability Risk (field 80) – This value is not entered into the database. The analysis program will calculate this value. This field provides an estimate of risk based on the results for Percent Difference in Field 79. To classify this yourself, the codes are as follows. A rating LOW applies when Field 79 is between minus 25 and plus 25 percent. MODERATE applies when the value is between 25 and 74 percent, or, when between minus 25 and minus 75 percent. Finally, HIGH risk applies when the value is equal to or greater than 75 percent, or, when it's less than minus 75 percent, or, whenever Uncharacteristic classes are present. In summary, "Low" implies that the sustainability risk is within the historical range of variability, or HRV. And, "moderate" and "high" are successively outside the historical range
Risk Classes (based on field 79):

Abundance (field 81) – This value is not entered into the database. The analysis program will calculate this value. To classify this yourself use the results from the previous Percent Difference and the following class ranges:

Abundance Classes (based on field 79):

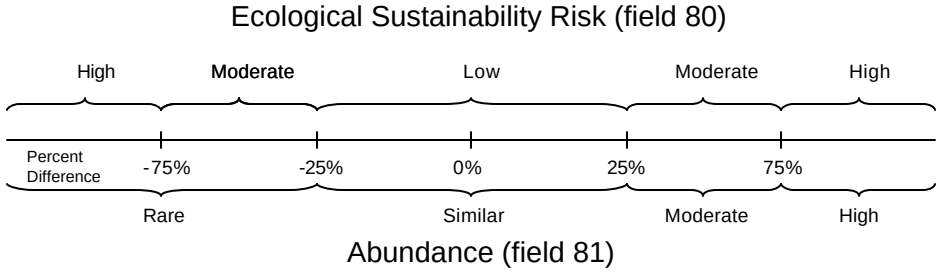
R - RARE (≤-25% Diff);

S - SIMILAR (> - 25% & < + 25% Diff);

M - MODERATE (≥ + 25% and ≤ + 75% Diff);

H - HIGH (> + 75% Difference or > 0% Uncharacteristic).

To help you envision this better, here's a graph showing the Risk and Abundance variables on a continuum.



Current Veg-Fuel Departure (field 82) – This value is not entered into the database. To calculate this yourself subtract the value in field 78 from 100%. This is the dissimilarity to the central tendency of the natural regime.

Veg-Fuel Condition Class (field 83) – This value is not entered into the database. To classify this yourself categorize the current veg-fuel departure value (field 82) into a condition class: condition class 1 (within natural/historical range of variability) = ≤ 33%; condition class 2 (moderate departure) = > 33% to 66%; condition class 3 (high departure) = > 66%.

Current Fire Frequency Departure (field 84) – This value is not entered into the database. To calculate this yourself determine (1 – (smaller of field 51 or 52) / larger of field 51 or 52)) * 100.

Current Fire Severity Departure (field 85) - This value is not entered into the database. To calculate this yourself determine (1 – (smaller of field 53 or 54) / larger of field 53 or 54)) * 100.

Current Frequency-Severity Departure (field 86) – This value is not entered into the database. To calculate this yourself determine ((field 84 + field 85) / 2).

Frequency-Severity Condition Class (field 87) – This value is not entered into the database. To classify this yourself categorize the current frequency-severity departure value (field 82) into a condition class: condition class 1 (within natural/historical range of variability) = ≤ 33%; condition class 2 (moderate departure) = > 33% to 66%; condition class 3 (high departure) = > 66%.

Strata Fire Regime Condition Class (field 88) – This value is not entered into the database. To classify this yourself enter the greater of field 83 or 87.

Percent of Area (Field 41). These boxes represent the percent of the Landscape occupied by each Strata. Here, you re-enter the data from Field 41 on your Strata worksheets. Again, always double-check that your Strata total 100 percent of the Project Landscape.

Natural Fire Frequency (Field 51). Now, you simply re-enter the Reference fire frequencies from Field 51.

Field 92 – This value is not entered into the database. To classify this yourself, divide Field 41 by 100, then multiply by Field 51. This is the weighted fire frequency for each Strata.

Weighted Mean Fire Frequency (field 93) – This value is not entered into the database. To classify this yourself, sum the above values to derive a Weighted Fire Frequency for Project Landscape.

Weighted Mean Fire Frequency Class (field 94) – This value is not entered into the database. To classify this yourself, enter "Frequent" if Field 93 is less than 35 years. Enter "Infrequent" if it's 36 to 200 years, or "Rare" if more than 200 years.

Field 95 – This value is not entered into the database. To classify this yourself, divide Field 41 by 100, then multiply by Field 53. This yields a weighted fire severity value for each Strata.

Landscape Natural Fire Severity (field 96) – This value is not entered into the database. To classify this yourself, sum the above values (field 95) to diagnose the Natural Fire Severity value for the Project Landscape.

Landscape Natural Fire Severity Class (field 97) – This value is not entered into the database. To classify this yourself, enter "Surface" if Field 96 is less than 25 percent. Enter "Mixed" if it's 26 to 75 percent, or "Replacement" if more than 75 percent.

Landscape Natural Fire Regime Group (field 98) – This value is not entered into the database. To classify this yourself, enter class based on the combination of field 94 and field 97:I - frequent, surface & mixed, II - frequent, replacement, III - infrequent, mixed & surface, IV - infrequent, replacement, V - rare, replacement.

Current Veg-Fuel Departure (field 82) – Enter field 82 from the Strata Worksheet (previous field 82 above).

Field 99 – This value is not entered into the database. To classify this yourself, divide Field 41 by 100, then multiply by Field 82. Again, use the literal digit in the Field 41 box, not a percent value.

Project Veg-Fuel Weighted Departure (Field 100) – This value is not entered into the database. To classify this yourself, sum the previous values (field 99) to diagnose the weighted Veg-Fuel departure for the entire landscape.

Field 86. Project Fire Frequency-Severity Departure – This value is not entered into the database. Here, you simply re-enter the Field 86 values from the Strata forms.

Weighted Fire Frequency-Severity Departure (field 101) –This value is not entered into the database. To classify this yourself, divide Field 41 by 100, then multiply by Field 86.

Field 102 Fire Frequency-Severity Weighted Departure – This value is not entered into the database. To classify this yourself, sum the above values (field 101) to diagnose Frequency-Severity Departure for the entire Landscape.

Field 103 – This value is not entered into the database. To classify this yourself, enter the greater of the Field 100 or 102 values. This box simply represents the worst-case departure among the vegetation- and fire variables.

Field 104 Project Fire Regime Condition Class – This value is not entered into the database. When Field 103 is less than or equal to 33 percent, the Condition Class is "1". Condition Class 2 ranges from 34 to 66 percent, and Condition Class 3 is any score above 66 percent.

Trend to condition class 1 will be calculated using pre-treatment and post-treatment assessments or estimates using the "difference" formula. The software program will determine this value for you. If you would like to determine this yourself you will need a pre and post assessment and use the following formula (note this is not a field found on your worksheet – it is an output from the software). The software will choose the higher of the two departures (Veg-Fuel or Frequency-Severity) to determine this trend.
Difference is calculated as: % Difference = ((Pretreatment - Posttreatment)/(Pretreatment)) * 100.

The results from the "difference" calculation will be used to classify trend as follows:

D – Degradation in Condition Class = $\leq$ - 10%

N – No change in Condition Class = > - 10 % and < + 10&

I – Improvement in Condition Class = $\geq$ + 10%

Drawing the Worksheet Graphs

The software will create the graphs for you. However, below are the procedures for how to graph the results by hand.

Frequency and Severity Classification graph (on the left side – see below).

Step 1. On the Y-axis, place a small tick mark to locate your Project Fire Frequency (Field 93).

Step 2. On the X-axis, mark the Project Fire Severity percent that you entered in Field 96.

Step 3. Now you simply integrate those two variables. That is, project the Y-axis value horizontally and project your X-axis value vertically. The intersection of those lines shows the dominant Fire Regime group.

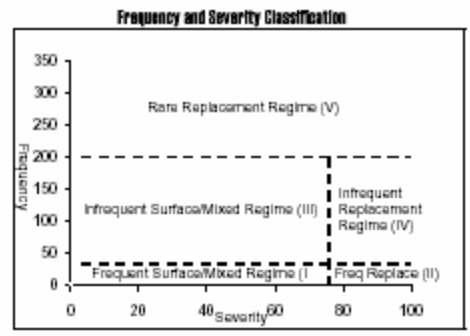
Project Condition Class graph (on the right side – see below).

Step 1. On the Y-axis, place a mark showing your Frequency-Severity weighted departure (Field 102).

Step 2. On the X-axis, place a tick mark for the Veg-Fuel weighted departure that you entered in Field 100.

Step 3. Now integrate those two variables. Again, project the Y-axis value horizontally, then project your X-axis value vertically. The intersection of the two lines shows the Project Condition Class.

One final point about the Condition Class graph. Notice that the margins contain several notes interpreting the restoration context. For example, assume for a moment that your lines had intersected in the upper left-hand side of the graph. That portion of the graph suggests that restoration of fire effects should probably have a higher priority than restoring vegetation. Conversely, the lower right side of the graph suggests that vegetation restoration might be a high priority, and so on.


Frequency and Severity Classification
Frequency
350
300
250
200
150
100
50
0
Rare Replacement Regime (V)
Infrequent Surface/Mixed Regime (III)
Infrequent Replacement Regime (IV)
Frequent Surface/Mixed Regime (I
Freq Replace (II)
0
20
40
60
80
100
Severity

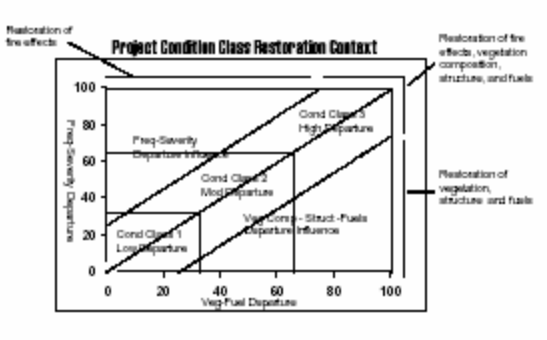

Project Condition Class Restoration Context
Restoration of fire effects
Restoration of fire effects, vegetation composition, structure, and fuels
Restoration of vegetation, structure and fuels
Freq-Severity Departure
100
80
60
40
20
0
Cond Class 3 High Departure
Freq-Severity Departure Influence
Cond Class 2 Mod Departure
Veg-Comp - Struct -Fuels Departure Influence
Cond Class 1 Low Departure
0
20
40
60
80
100
Veg-Fuel Departure

Table 3-1 - Natural (historical) fire regime groups for assessment of landscape dynamics and departure from natural (historical) range and variability (NRV or HRV) at landscape scales

Fire Regime Group	Frequency (Fire Return Interval)	Severity	Description
I	0 – 35+ years, Frequent	Surface/ Mixed	Open park-like, savannah grassland, or mosaic forest, woodland, or shrub structures maintained by frequent surface or mixed severity fires; surface fires typically burn through a forest understory removing fire intolerant species and small size classes and removing < 25% of the upper layer, thus maintaining an open single layer overstory of relatively large trees; mosaic fires create a mosaic of different age post-fire savannah forest, woodlands, or open shrub patches by leaving > 25% of the upper layer (generally < 40 hectares (100 acres)). Interval can range up to 50 in systems with high temporal variability.
II	0 – 35+ years, Frequent	Replace-ment	Shrub or grasslands maintained or cycled by frequent fire that removes > 75% of the upper layer; fires kill non-sprouting shrubs such as sagebrush which typically regenerate and become dominant within 10-15 years; fires remove tops of sprouting shrubs and grass, such as mesquite, chaparral, or bunchgrass, which typically resprout and dominate within 5 years; fires typically kill most tree regeneration such as juniper, pinyon pine, ponderosa pine, Douglas-fir, or lodgepole pine. Interval can range up to 50 in systems with high temporal variability.
III	35 – 100+ years-, Infrequent	Mixed	Mosaic of different age post-fire open forest, early to mid-seral forest structural stages, and shrub or herb dominated patches (generally < 40 hectares (100 acres)) maintained or cycled by infrequent fire that removes < 75% of the upper layer. Interval can range up to 200 in systems with high temporal variability.
IV	35 – 100+ years, Less Infrequent	Replace-ment	Large patches (generally > 40 hectares (100 acres)) of similar age post-fire shrub or herb dominated structures, or early to mid-seral forest cycled by infrequent fire that removes > 75% of the upper layer. Interval can range up to 200 in systems with high temporal variability.
V	> 100-200 years, Rare	Replace-ment	Large patches (generally > 40 hectares (100 acres)) of similar age post-fire shrub or herb dominated structures, or early to mid to late seral forest cycled by infrequent fire that removes > 75% of the upper layer.

Table 3-2. Code Potential lifeform

Code	Biophysical (BpLU) Lifeform
AQ	Aquatic -- Lake, pond, bog, river
NV	Non-vegetated -- Bare soil, rock, dunes, scree, talus
CF	Coniferous upland forest -- Pine, spruce, hemlock
CW	Coniferous wetland or riparian forest -- Spruce, larch
BF	Broadleaf upland forest -- Oak, beech, birch
BW	Broadleaf wetland or riparian forest – Tupelo, cypress
SA	Shrub dominated alpine – Willow
SU	Shrub dominated upland – Sagebrush, bitterbrush
SW	Shrub dominated wetland or riparian -- Willow
HA	Herbaceous dominated alpine -- Dryas
HU	Herbaceous dominated upland – grasslands, bunchgrass
HW	Herbaceous dominated wetland or riparian -- ferns
ML	Moss or lichen dominated upland or wetland
OT	Other BpLU vegetation lifeform

Table 3-3. Reference Condition Characteristics for 34 Forested PNVGs, Western U.S.

PNVG_Name	Code	A: Early Seral %	B: MidSer. Closed %	C: MidSer. Open %	D: LateSer. Open %	E: LateSer. Closed %	Fire Freq (MFI)	Dominant Fire Regime[1]	Repl. Fire %
California Mixed Conifer	MCON	5	15	35	40	5	15	I	5
California Mixed Evergreen	CAME	10	30	15	20	25	17	I	17
Cedar-Hemlock_Douglas-fir	CHDF	10	35	5	5	45	233	V	77
Cedar-Hemock-Pine (Washington)	CHPI	15	49	1	5	30	125	IV	75
Decid. Woodland Oak-Asp. with Conifer	DWOA	15	15	40	25	5	10	I	15
Douglas-fir Interior Pacific Northwest	DFIR1	10	10	20	45	15	15	I	5
Douglas-fir Interior Rocky Mountains	DFIR2	15	25	20	25	15	30	III	10
Fir-Hemlock (Wash., Oreg), Forest	FHWO1	15	25	5	10	45	769	V	85
Fir-Hemlock (Wash., Oreg), Parkland	FHWO2	44	25	1	1	29	769	V	92
Grand Fir-Douglas fir	GFDF	15	45	10	5	25	59	III	30
Great Basin Pine (Nevada, Utah)	GBPI	25	0	12	54	9	400	III, V	12
Lodgepole Pine-Subalpine Calif.	LPSC	20	10	30	30	10	77	III	25
Mosaic Cedar-Hemlock – DFir/Oak (Oreg)	CHDO	10	30	5	15	40	200	V, III	60
Pine-Douglas fir-Central Rockies	PPDF3	15	10	20	45	10	33	I	15
Pine-Douglas fir-Colorado Plateau	PPDF5	15	10	20	50	5	12	I	10
Pine-Douglas fir-Southwest	PPDF7	15	5	15	60	5	10	I	5
Ponderosa Pine Black Hills	PPIN9	10	15	25	40	10	23	I	12
Ponderosa Pine Colorado Plateau	PPIN5	5	5	15	65	10	6	I	5
Ponderosa Pine Northern & C.Rockies	PPIN2	10	10	20	55	5	17	I	7
Ponderosa Pine PNW/Great Basin	PPIN1	10	5	20	55	10	15	I	10
Ponderosa Pine Southern Rockies	PPIN6	15	5	25	50	5	17	I	10
Ponderosa Pine Southwest	PPIN7	15	4	20	60	1	4	I	5
Ponderosa Pine-Douglas-fir (Inland NW)	PPDF1	15	10	25	40	10	22	I	24
Ponderosa Pine-Douglas-fir S.Rockies	PPDF6	15	10	30	35	10	38	III	10
Red Fir-California	RFCA	10	10	5	40	35	44	III	10
Redwood-California	RWCA	10	20	5	5	60	32	I	16
Silver Fir-Douglas-fir	SFDF	5	20	5	5	65	625	V	88
Southwestern Mixed Conifer	MCAN	10	5	20	60	5	10	I	5
Spruce-Cedar-Hemlock (Wash., Oreg.)	SCWO	5	30	10	10	45	833	V	100
Spruce-fir Douglas-fir	SPDF	5	25	28	22	20	19	III	6
Interior West Lower Subalpine Forest #1[2]	SPFI1	20	35	15	10	20	111	IV	67
Interior West Lower Subalpine Forest #2	SPFI5	20	40	10	5	25	167	V	83
Interior West Lower Subalpine Forest #3	SPFI7	25	35	20	10	10	91	III, IV	46
Interior West Upper Subalpine Forest	SPFI2	20	25	25	15	15	143	III-V	57

[1] I (0-35 yr/Low Severity); II (0-35 yr/Std. Replacmt); III (35-100+/Mixed Severity); IV (35-100+/Std. Replacemt); V (200+ yr/Std. Replacemt).

[2] *Interior West Lower Subalpine Forest #1* = Moderately frequent fire (e.g., Northern Rockies & west side of Central/Southern Rockies).

Interior West Lower Subalpine Forest #2 = Relatively infrequent fire (e.g., Pacific Northwest & east side of Central/Southern Rockies).

Interior West Lower Subalpine Forest #3 = Relatively frequent fire (e.g., Southwestern U.S.)

Table 3-4. Reference Condition Characteristics for 52 Non-forested PNVGs, Western U.S.

PNVG_Name	Code	A: Early Seral %	B: MidSer. Closed %	C: MidSer. Open %	D: LateSer. Open %	E: LateSer. Closed %	Fire Freq (MFI)	Repl. Fire %	Dominant Fire Regime[3]
Alder-Ash (Oregon, Washington)	AAOW	22	52	3	2	21	63	80	IV
Alpine Meadows-Barren	AMDW	2	20	78	0	0	120	80	IV
Blue Oak Woodlands	OKCA1	5	10	20	55	10	10	5	I
Calif. Annual Grassland	AGRA1	40	60	0	0	0	5	100	II
Calif. Annual Grassland With Shrubs	AGRA2	35	50	0	10	5	5	95	II
Calif Steppe Grassland	CAST1	30	40	30	0	0	5	100	II
Calif. Steppe Grassland with Shrubs	CAST2	30	25	30	10	5	5	95	II
Chaparral, Interior	CHAP5	20	45	5	5	25	45	90	IV
Chaparral, Mesic (Coastal California)	CHAP2	20	50	15	5	10	8	20	III
Chaparral, Montane	CHAP4	25	35	9	1	30	31	85	II
Chaparral, Xeric (Coastal California)	CHAP1	20	45	25	5	5	8	77	II
Desert Grassland	DGRA1	15	20	65	0	0	10	93	II
Desert Grassland With Shrubs	DGRA3	3	20	65	8	4	10	93	II
Desert Grassland With Trees	DGRA2	5	25	67	2	1	8	99	II
Desert Shrubland, No Grasses	DSHB4	5	15	80	0	0	77	55	III, IV
Desert Shrubland With Grasses	DSHB2	10	15	75	0	0	43	60	III, IV
Desert Shrubland With Trees	DSHB3	7	25	65	2	1	40	60	III, IV
Desert Shrub-Salt Desert Shrub	DSHB1	5	40	55	0	0	40	60	III, IV
Juniper Steppe-Ancient	JUST2	4	4	10	80	2	286	43	III, V
Juniper Steppe-Infrequent Fire	JUST1	5	5	20	55	15	118	35	III, IV
Juniper-Pinyon Frequent Fire	JUPI1	20	10	20	40	10	31	41	III, IV
Juniper-Pinyon Infrequent Fire	JUPI2	10	15	5	10	60	400	92	V
Mesquite Bosques (New Mexico)	MBNM	10	35	20	15	20	46	32	III
Mtn. Grassland	MGRA1	15	15	45	20	5	16	80	II
Mtn. Grassland With Shrubs	MGRA3	5	90	5	0	0	20	99	II
Mtn. Grassland With Trees	MGRA2	15	10	60	10	5	15	60	II, I
Mtn. Shrubland	MSHB2	25	25	10	10	30	42	100	IV
Mtn. Shrubland With Trees	MSHB1	40	20	10	5	25	19	90	II
Northern California Garry Oak	OKCA2	5	10	20	55	10	10	5	I
Northern Plains Grassland	PGRA1	15	25	15	30	15	11	80	II
N. Plains Grassland With Shrubs	PGRA3	13	35	50	2	0	9	80	II
N. Plains Grassland With Trees	PGRA2	8	35	15	40	2	10	55	III, II
Plains Oaks/Shinnery	POAK	55	30	5	5	5	13	75	II
Prairie Grassland	PRAR1	1	44	55	0	0	8	90	II
Prairie Grassland With Shrubs	PRAR3	2	50	45	3	0	8	85	II
Prairie Grassland With Trees	PRAR2	2	53	40	4	1	8	80	II
Riparian (willow-sedge)[4]	RIPA	Var.	Var.	Var.	Var.	Var.	Var.	Var.	Var.
Sagebrush-Basin Big	BSAG1	25	20	25	15	15	24	61	II
Sagebrush-Basin Big, With Trees	BSAG2	25	20	35	15	5	24	51	II, III
Sagebrush-Warm (Wyoming big sagebrush)	WSAG1	15	5	15	50	15	54	54	III, II
Sagebrush-Warm, With Trees	WSAG2	15	5	10	50	20	60	46	III, IV

[3] I (0-35 yr/Low Severity); II (0-35 yr/Std. Replacmt); III (35-100+/Mixed Severity); IV (35-100+/Std. Replacemt); V (200+ yr/Std. Replacemt).

[4] NOTE: Riparian PNVG currently too variable for development of a default model.

PNVG_Name	Code	A: Early Seral %	B: MidSer. Closed %	C: MidSer. Open %	D: LateSer. Open %	E: LateSer. Closed %	Fire Freq (MFI)	Repl. Fire %	Dominant Fire Regime[3]
Sagebrush-Cool (Mountain Big Sagebrush)	CSAG1	20	25	40	10	5	17	40	III, II
Sagebrush-Cool, With Trees	CSAG2	20	20	35	15	10	20	40	III, IV
Sagebrush-Other (Silver, Wyoming)	SAGE1	25	20	30	10	15	25	75	II
Sagebrush-Other, With Trees	SAGE2	15	5	35	40	5	25	45	III, II
Southern Plains Grassland	PGRA4	5	20	75	0	0	10	90	II
S. Plains Grassland With Shrubs	PGRA6	5	20	70	5	0	10	86	II
S. Plains Grassland With Trees	PGRA5	5	20	70	4	1	10	83	II
Southwest Shrub Steppe	SWSS1	5	10	85	0	0	10	90	II
Southwest Shrub Steppe With Trees	SWSS2	4	15	75	5	1	8	85	II
Texas Savanna	TSAV	45	20	20	5	10	10	50	II, III
Wet Grassland	WGRA	15	80	5	0	0	5	75	II

Table 3-6. Coarse-scale vegetation-fuel class descriptions.

Vegetation-Fuel Class	Process	Forest & Woodland	Shrubland & Grassland
AESP-Characteristic; Early Seral	Post-replacement disturbance; young age	Single layer; fire response shrub, graminoids, and forbs; typically < 10% tree canopy cover; Standing dead and down	Fire response forbs; resprouting shrubs; resprouting graminoids
BMSC-Characteristic; Mid Seral Closed	Mid successional; mid age; competition stress	One to two upper layer size classes; > 35% canopy cover (crown closure estimate); standing dead & down; litter/duff; standing dead and down	Upper layer shrubs or grasses; < 15% canopy cover (line intercept)
CMSO-Characteristic; Mid Seral Open	Mid successional; mid age; disturbance maintained	One size class in upper layer; < 35% canopy cover; fire-adapted understory; scattered standing dead and down	Upper layer shrubs or grasses; > 15% canopy cover shrubs
DLSO-Characteristic; Late Seral Open	Late successional; mature age; disturbance maintained	Single upper canopy tree layer; One to three size classes in upper layer; < 35% canopy cover; fire-adapted understory; scattered standing dead and down	Upper layer shrubs or grasses; < 15% canopy cover
ELSC-Characteristic; Late Seral Closed	Late successional; mature age; competition stress	Multiple upper canopy tree layers; Multiple size classes; > 35% canopy cover; shade- tolerant understory; litter/duff; standing dead and down	Upper layer shrubs or grasses; > 15% canopy cover shrubs
UINP–Uncharacteristic; Invasive Plants	Invasive plants, such as annual grasses or knapweed; difficult to reverse with restoration if large and scattered infestations; most effective to prevent and contain	Commonly spread along roads and in harvest units with mechanical soil surface disturbance; more competitive than native grasses and forbs	Commonly spread along roads and by livestock; more competitive than native plants; usually associated with increase (annual grasses) or decrease (knapweed) in fire frequency
UTHV-Uncharacteristic Timber Mgt Not Mimicking Natural Regime	Timber harvest, stand improvement, and tree planting is not similar to natural regime; road density may be excessive; often lacks dead and down trees and logs; patterns are typically linear or uniform rather than irregular and random or clumped	Commonly involves cutting of large trees & leaving small trees; timber thinning to systematic single tree spacing rather than group trees with variable spacing; planting higher density or different species composition than natural, or off-site stock; high density road system enhancing invasive plant spread, rerouting of water & sediment, and animal displacement/harassment	

Vegetation-Fuel Class	Process	Forest & Woodland	Shrubland & Grassland
UGRZ-Uncharacteristic Grazing Mgt. Not Mimicking Natural Regime	Grazing season, frequency, and intensity is not similar to natural regime; pattern is often uniform vs. irregular utilization	Often associated with loss of shrub and grass understory; spread of invasive weeds	Decrease in desirable forage species; increase in less desirable and invasive species
UFUS–Uncharacteristic Fuels/Succession/Lack Fire Effects	Natural disturbance frequency is beyond maximum allowing fuel accumulation or structure that did not occur naturally	Usually associated with change to larger patch size and loss of patch mosaic with more contiguous heavy fuels	Usually associated with change to larger patch size and loss of patch mosaic with more contiguous upper layer fuels
UFEF-Uncharacteristic; Post-fire Effects More Severe Than Natural	Effects of fire on plants, soil, water, and air more severe than natural because of higher than natural or different fuel loads; difficult to reverse with restoration; most effective to restore classes I, H, G, and L before this occurs	Commonly occurs in areas with heavy contiguous fuels due to uncharacteristic succession, timber mgt., or insect-disease effects; loss of large trees, excessive smoke, soil erosion, increased water temperatures	Commonly occurs in areas with contiguous upper layer fuels due to uncharacteristic succession or invasive plants
USHD-Uncharacteristic; Soil/Hydrologic Disturbance More Severe	Changes or diversion of flow, channelization, loss of biota, sedimentation, or changes in evapotranspiraton. Increased soil erosion, compaction, or displacement.	In forest stream chanelization, changes in vegetation evapotranspiraton, and shift in flow amounts. In woodland the loss of understory herbaceous cover of soil resulting in increased erosion. Increased vegetation evapotranspiraton reducing flow from springs. Loss of beaver and associated ponds & cutting.	Reduced width in wet riparian zones or drying that change fire behavior & effects. Loss of upland soil cover resulting in increased soil erosion. Increased vegetation evapotranspiraton reducing flow from springs. Loss of beaver and associated ponds & cutting allowing fires to spread across riparian zones.
UIDS-Uncharacteristic Insect-Disease Invasive or More Severe	Invasive insects or disease, such as blister rust; or epidemic or level of extent not similar to natural regime	Commonly occurs following uncharacteristic timber harvest of large trees leaving small insect-disease susceptible trees	
UCLR-Uncharacteristic cultural treatments	Cultural treatments do not mimic the natural disturbance regime or pattern	Timber stand improvements, burned area restoration, or road networks that preclude successional stages or patterns	Range improvements, burned area restoration, roads that preclude successional stages or patterns
UPAT	Alteration of disturbance regimes have changed the patch pattern	Harvest, fire exclusion, or uncharacteristic fires result In uncharacteristic patterns.	Grazing, fire exclusion, or uncharacteristic fires result in uncharacteristic patterns
UOTH – Uncharacteristic; other disturbances	Other human altered disturbance processes		